

CLAIMS

What is claimed is:

1 1. A method for generating memory requests to fetch read data from a memory, the
2 memory comprising a plurality of memory pages, each of the memory pages having a
3 plurality of words, the method comprising the steps of:

4 determining a location of the read data in the memory;
5 selecting a packetization scheme based on the location of the read data and on
6 fitting the read data into a plurality of data packets; and
7 assembling at least one read command for fetching the read data from the
8 memory in accordance with the selected packetization scheme.

1 2. The method of claim 1 further comprising the step of sending the at least one
2 read command corresponding to the plurality of data packets to the memory.

1 3. The method of claim 2 further comprising the step of fetching the read data in
2 response to sending the at least one read command.

1 4. The method of claim 1 wherein the read data comprises a reference pixel chunk
2 having a luminance chunk and a chrominance chunk.

1 5. The method of claim 4 wherein the step of determining the location of the read
2 data further comprises receiving at least a set of motion vectors pointing to the
3 reference pixel chunk.

1 6. The method of claim 5 further comprising the step of determining a first set of
2 components associated with the reference pixel chunk based on the at least a set of
3 motion vectors.

1 7. The method of claim 4 wherein the step of selecting a packetization scheme
2 further comprises combining a part of the luminance chunk and a part of the
3 chrominance chunk into one of the plurality of data packets to be sent from the memory
4 when the luminance chunk overlaps more than one of the plurality of memory pages.

1 8. The method of claim 4 wherein the step of selecting a packetization scheme
2 further comprises combining a first part of the luminance chunk and a second part of
3 the luminance chunk into one of the plurality of data packets to be sent from the
4 memory when the luminance chunk overlaps more than one of the plurality of memory
5 pages.

1 9. The method of claim 4 wherein the step of selecting a packetization scheme
2 further comprises combining a first part of the chrominance chunk and a second part of
3 the chrominance chunk into one of the plurality of data packets to be sent from the
4 memory when the chrominance chunk overlaps more than one of the plurality of
5 memory pages.

1 10. The method of claim 4 further comprising the step of placing a virtual memory
2 page boundary across the luminance chunk, the virtual memory page boundary being
3 associated with the packetization scheme.

1 11. The method of claim 4 further comprising the step of placing a virtual memory
2 page boundary across the chrominance chunk, the virtual memory page boundary
3 being associated with the packetization scheme.

1 12. The method of claim 1 wherein the packetization scheme selected maps a first set
2 of components to a second set of components by a table lookup.

1 13. The method of claim 12 wherein the first set of components comprises the read
2 data corresponding to the luminance chunk and the chrominance chunk, and the
3 second set of components comprises the selected ones of the plurality of words.

1 14. The method of claim 1 wherein each of the at least one read command includes
2 specifications for combining selected ones of the plurality of words from selected ones
3 of the plurality of memory pages into the plurality of data packets.

1 15. The method of claim 1 wherein the plurality of data packets is equal to or less
2 than a predetermined number.

1 16. The method of claim 15 wherein the predetermined number is four and the
2 selected ones of the plurality of memory pages is two.

1 17. The method of claim 15 wherein the predetermined number is four and the
2 selected ones of the plurality of memory pages is three.

1 18. The method of claim 1 wherein the plurality of data packets comprise 16 words.

1 19. A method for packing read data into data packets, the read data being stored in a
2 memory, the memory comprising a plurality of memory pages, the method comprising
3 the steps of:

4 receiving at least one read command requesting the read data, the at least one
5 read command comprising specifications for including in the data packets a selected
6 portion of the read data from at least one of the plurality of memory pages;

7 sending instructions to the memory according to the at least one read command
8 received, the instructions relating to a manner in which the read data requested is to be
9 obtained from the memory;

10 receiving the read data from the memory in response to the memory receiving
11 the instructions; and

12 packing the read data received into the data packets according to the
13 specifications of each of the at least one read commands.

1 20. The method of claim 19 wherein the read data is a reference pixel chunk
2 comprising a luminance chunk and a chrominance chunk.

1 21. A method for reassembling reference pixel data from a plurality of data packets
2 into a luminance chunk and a chrominance chunk, comprising the steps of:

- 3 receiving the plurality of data packets, each data packet comprising a portion of
- 4 a reference pixel chunk including the luminance chunk and the chrominance chunk;
- 5 determining a packetization scheme, the packetization scheme being used to
- 6 packetize the luminance and chrominance chunks into the plurality of data packets; and
- 7 unpacking the plurality of data packets into a reassembled luminance chunk and
- 8 a reassembled chrominance chunk based on the packetization scheme.

1 22. The method of claim 21 further comprising the steps of forming prediction
2 blocks by arranging the plurality of data packets unpacked with any information
3 related to motion vectors, and combining blocks with associated macroblocks to form a
4 reconstructed macroblock.

- 1 23. The method of claim 22 further comprising the step of writing the reconstructed
- 2 macroblock to a memory;
- 3 selecting a packetization scheme based on a location of read data and on fitting
- 4 the read data into the plurality of data packets; and
- 5 assembling at least one read command for fetching the read data from the
- 6 memory in accordance with the packetization scheme selected.

1 24. A machine readable medium having embodied thereon a program, the program
2 being executable by a machine to perform method steps for generating memory
3 requests to fetch read data from a memory, the method steps comprising:
4 determining a location of the read data in the memory;
5 selecting a packetization scheme based on the location of the read data and on
6 fitting the read data into a plurality of data packets; and
7 assembling at least one read command for fetching the read data from the
8 memory in accordance with the selected packetization scheme.

1 25. A machine readable medium having embodied thereon a program, the program
2 being executable by a machine to perform method steps for packing read data into data
3 packets, the method steps comprising:
4 receiving at least one read command requesting the read data, the at least one
5 read command comprising specifications for including in the data packets a selected
6 portion of the read data from at least one memory page;
7 sending instructions to the memory according to the at least one read command
8 received, the instructions relating to a manner in which the read data requested is to be
9 obtained from the memory;
10 receiving the read data from the memory in response to a memory receiving the
11 instructions; and
12 packing the read data received into the data packets according to the
13 specifications of each read command.

1 26. A system for generating memory requests to fetch read data from a memory,
2 comprising:
3 means for determining a location of the read data in the memory;
4 means for selecting a packetization scheme based on the location of the read data
5 and on fitting the read data into a plurality of data packets; and
6 means for assembling at least one read command for fetching the read data from
7 the memory in accordance with the selected packetization scheme.

1 27. A system for packing read data into data packets, comprising:
2 means for receiving at least one read command requesting the read data, the read
3 command comprising specifications for including in the data packets a selected portion
4 of the read data from at least one memory page;
5 means for sending instructions to a memory according to the read command
6 received, the instructions relating to a manner in which the read data requested is to be
7 obtained from the memory;
8 means for receiving the read data from the memory in response to the memory
9 receiving the instructions; and
10 means for packing the read data received into the data packets according to the
11 specifications of each read command.

1 28. A system for decoding pictures in a compressed video bit stream, comprising:
2 a memory having a plurality of memory pages storing reference pixel data;
3 an address generator coupled to the memory for generating memory commands
4 for fetching the reference pixel data from the memory; and
5 a reference data assembly module coupled to the address generator for receiving
6 from the memory a plurality of data packets having a portion of the reference pixel
7 data.

1 29. The system of claim 28 wherein the reference pixel data comprises a luminance
2 chunk and a chrominance chunk.

1 30. The system of claim 28 wherein the memory commands comprises specifications
2 for combining selected portions of the reference pixel data from a selected one or more
3 of the plurality of memory pages into at least one of the plurality of data packets.

1 31. The system of claim 28 wherein the reference data assembly module unpacks the
2 plurality of data packets to transform the reference pixel data into a reassembled
3 luminance chunk and a reassembled chrominance chunk.

1 32. The system of claim 28 wherein the reference data assembly module comprises a
2 plurality of data buffers, each data buffer being configured to receive one of the
3 plurality of data packets.

1 33. The system of claim 28 wherein the reference data assembly module comprises
2 an additional module for reassembling the reference pixel data based on a set of motion
3 vectors, a table lookup and packetization scheme used to form the plurality of data
4 packets.

1 34. The system of claim 28 wherein the reference data assembly module comprises a
2 plurality of data buffers for buffering a reassembled luminance chunk and a
3 reassembled chrominance chunk.

1 35. The system of claim 28 further comprising a variable length decoding module
2 configured to extract a set of motion vectors corresponding to a macroblock in the
3 compressed video bit stream.

1 36. The system of claim 35 wherein the variable length decoding module sends the
2 extracted set of motion vectors to the address generator.

1 37. The system of claim 28 further comprising a memory interface unit coupled to
2 the memory.

1 38. The system of claim 37 wherein the memory interface unit further comprises a
2 memory queue for storing the generated memory commands from the address
3 generator.

4

1 39. The system of claim 38 wherein at least one of the plurality of data packets
2 includes the reference pixel data from at least two of the plurality of memory pages
3 based on the generated memory commands in the memory queue.

1 40. The system of claim 37 wherein the memory interface unit further comprises a
2 sequencer for forwarding the generated memory commands to the memory to obtain
3 the reference pixel data based on specifications.

1 41. The system of claim 37 wherein the memory interface unit further comprises a
2 packet assembly unit for assembling the plurality of data packets of the reference pixel
3 data obtained from the memory.